College of Veterinary Medicine / Department of Veterinary Preventive Medicine / School of Environment and Natural Resources

Beyond Farm Level Management: How Can Community Partnership Teams Enhance Management of Antibiotic-Resistant Bacteria on Livestock Operations

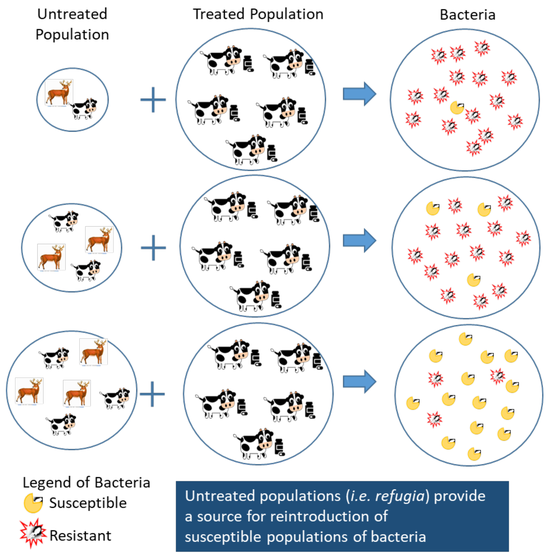
Sarah Mielke, Caroline Brock, Rebecca Garabed, Doug Jackson-Smith, Mark Flint, Kelly George, Stephen Matthews, Tom Wittum

INTRODUCTION

The emergence of antibiotic resistant bacteria in agriculture and its implications for livestock and human health is a growing concern. Research and policy focuses on the role of individual farms to prevent the emergence of antimicrobial resistance (AMR).

Assuming that the drivers of AMR are determined within the boundaries of a single farm may not be accurate. We are testing if aggregate patterns of farm sizes, landscape characteristics, and antimicrobial use across an entire community of farms, influences AMR.

For example, the presence of non-resistant (susceptible) bacteria in untreated livestock or wildlife may dilute populations of resistant bacteria, resulting in treatable rather than resistant infections. This is a hypothesized phenomenon, illustrated below:



RESEARCH QUESTIONS

1) How do patterns of farm scale, land-use, and antibiotic use interact to create patterns of antimicrobial resistance in a community?

2) Will protecting the viability of small/mid-sized farms play a role in reducing risks of AMR?

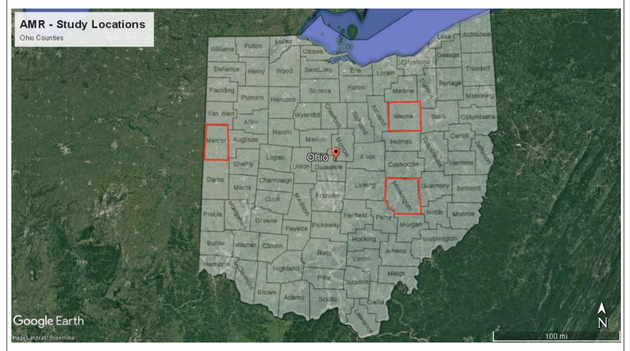
METHODS

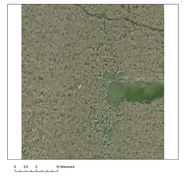
To build trust on a local level, Community Partnership Teams (CPTs), made up of local extension agents, veterinarians, and agricultural community leaders in each county will be formed. The teams will help coordinate between researchers and producers to improve the quality of research data, and ensure findings contribute to local community dialogues.

CPTs will collaborate with researchers to:

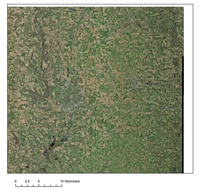
1. **Design Research Methods –** Identify representative farms and study sites; develop data collection protocols, interpret results
2. **Communicate About Project --** Discuss objectives of study with potential participants, increase transparency within communities
3. Develop **teaching and outreach materials** to stimulate awareness and discussion of ecological dynamics in local farm landscape.
4. Provide a **Voice** to each community

COUNTY CHARACTERISTICS



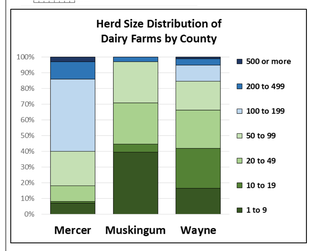


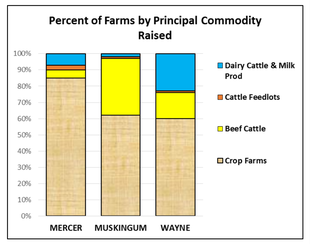
Mercer: Larger operations and homogenous landscape



Wayne: Diversity of large, mid- and small size operations; Mix of land-use (forest & farm)

Muskingum: Fewer and predominantly small-sized operations; most wild and diverse landscape





What are your **IDEAS** about enhancing our **COMMUNITY PARTNERSHIP?**

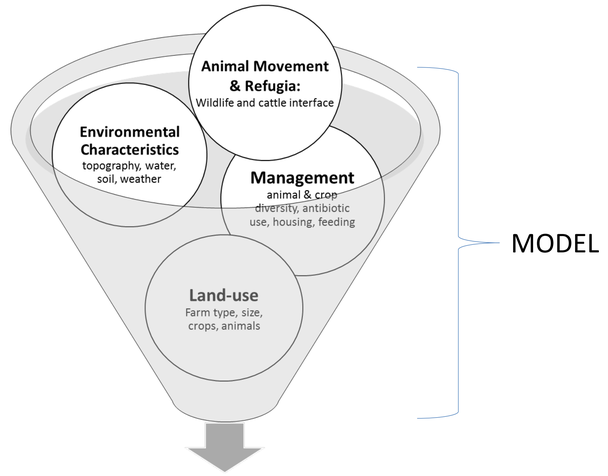
E-mail: **mielke.153@osu.edu** with interest in collaboration or suggestions.

DATA AND ANALYSIS

One-on-one interviews with Farmers

On-Farm Environmental Samples

Disease Models to evaluate how patterns of farm scale, land-use, and antibiotic use interact to create patterns of AMR .



OUTCOMES

- Resilient Community Partnerships
- Diverse understanding of existing AMR profiles across multiple landscapes and Implications for sustainable agriculture

BIBLIOGRAPHY

1. Park, A. W., Haven, J., Kaplan, R., & Gandon, S. (2015). Refugia and the evolutionary epidemiology of drug resistance. *Biology Letters*, *11*(11), 89–109. https://doi.org/10.1098/rsbl.2015.0783

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